



Prepared for:



Qanirtuuq, Inc  
PO Box 69  
Quinhagak, AK 99655

# KANEKTOK RIVER REROUTE

## Conceptual Design Report



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Prepared by:



CRW Engineering Group, LLC  
3940 Arctic Blvd. Suite 300  
Anchorage, AK 99503

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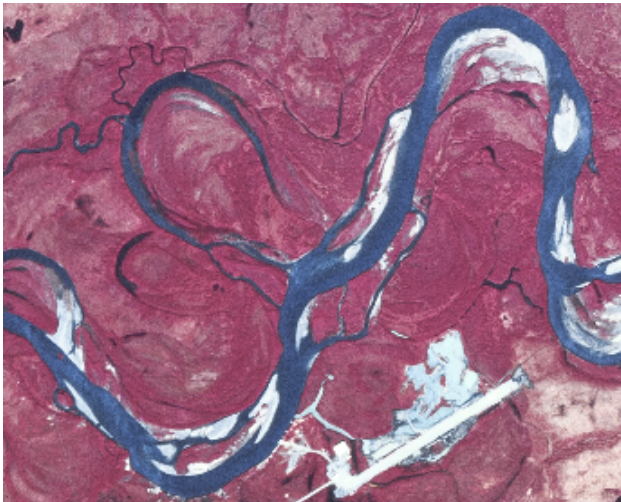
## 1. Introduction

This Conceptual Design Report (CDR) was prepared to assist Qanirtuuq Inc. (the local village corporation) and the community of Quinhagak with the pursuit of funding to divert a portion of the Kanektok River away from continued erosion of the old runway. CRW Engineering Group was been retained by Qanirtuuq Inc. to further develop the river reroute Alternative #1 from the “Kanektok River Erosion Study” (2019 Study) completed in February 2019. Both reroute Alternatives #1 and #2 are shown on Figure 1. This report includes information on the anticipated construction, permitting, site control and cost impacts of the river reroute along with proposed funding sources and a preliminary benefit-cost analysis.

## 2. History

### 2.1. The River

As documented in the 2019 Study, the Kanektok River runs along the northern part of Quinhagak, a community in southwest Alaska, before entering the Kuskowkim Bay. The river is roughly 90 miles in length, and braided with gravel bars and islands throughout its course. Historical photographs of the river from the 1960s to current, depict general erosion within the meandering zone. A significant river change occurred between 1982 and 2003 after construction of the gravel runway on the eastern side of the community. Photos show what appears to be a gravel extraction site (borrow pit) that was developed to mine construction materials for the runway, becoming captured by the river.



*Photo 1 & 2 – 1982 Runway Construction (left) and 2019 Current Condition (right)*

This event, presumably from a large spring thaw, directed the river closer to the runway, beginning to erode the gravel airstrip. The Alaska Department of Transportation and Public Facilities (ADOT&PF) funded the development of a new airport and gravel runway approximately 3,500 ft to the east. The old runway land was transferred to the local corporation, Qanirtuuq Inc. in and erosion has continued to take the area.

## 2.2. Erosion Protection

Over the years, various efforts have been deployed by the community to slow the erosion. Sand bags and super sacks have been placed, lost to erosion, and placed again. The old runway has served as access to the Qanirtuuq's gravel sites. Gravel is an important source of income for the company and a critical construction material for the community. Erosion of the runway has pushed this access road further away from the runway offsite towards the tundra and a small creek. There are concerns that if unchecked, this erosion could change the course of the river and bring it even closer to the community, threatening homes and infrastructure.

## 2.3. Current Conditions

The current condition of the river, including the depth and width along the 1950s Channel, was documented in October 2019. Photos were also taken in December 2019. The results shows that water and fish are still encountered in the 1950s Channel. This confirms the need to implement fish capture and relocation activities as the 1950s Channel becomes further developed as part of the "new channel" for the river reroute. Copies of the photographs and measurements of the river can be found in Appendix A.

## 2.4. Studies & Public Input

Qanirtuuq Inc., using a grant from the Denali Commission, hired CRW to complete the 2019 Study, a hydrologic and hydraulic analyses of the river to help determine a feasible option to reducing the erosion. The study evaluated mitigation options including armoring the eroding riverbank and rerouting an upper portion of the river to an older channel, away from the runway.

During the two public meetings that were held as part of the 2019 Study development, the community expressed concern about erosion in many areas and some thought an armored solution like the riprap that was installed along the community's water supply intake (downstream of the old runway), would be a good solution. It was acknowledged that the change in the river direction from the borrow pits was a "man-made" change and therefore rerouting an upstream portion of the river to an older channel could be an acceptable "man-made" change. Armoring the riverbank with anything substantial requires barging in materials, greatly increasing the costs of this option. The riprap that was installed at the water supply intake is a fraction of the area required at the old runway. Rerouting the river would require mobilizing similar equipment needed for armoring but without the materials and their associated shipping costs.

A draft study prepared by the Alaska Native Tribal Health Consortium (ANTHC) that identified infrastructure risks from climate change noted that the erosion along the old runway impacted a few private property owners and was not likely to receive public funds to mitigate. As of the writing of this report, ANTHC's study had not been finalized.

During the public process portion of completing updates to the Hazard Mitigation Plan for Quinhagak, the community did not initially identify mitigation of the old runway as a priority. There are a few outspoken residents who feel strongly that the current erosion is a significant threat to the community, however that does not appear to be a widely held belief. While the overall threat impacts aren't fully known, worst case assumptions predict damage to homes and infrastructure.

One possible construction approach for the river reroute Alternative #1 has been developed. CRW contracted with Herrera Consulting to prepare this construction work plan as they have coordinated river reroutes with other communities. This work plan is conceptual but lays out a feasible approach to rerouting the Kanektok River away from the old runway. A copy is included in Appendix B and summarized in the following section.

### 3. River Reroute Work Plan

Constructing the river reroute will require close coordination with several agencies including the Alaska Department of Fish & Game (ADF&G). We consulted with ADF&G as part of this CDR and have included copies of the required permit applications in Appendix C. Additional information on ADF&G and other agency requirements are discussed in Section 4 and listed in the summary of construction steps.

The work plan was developed to list the big ticket items that would be expected during construction of the river reroute. The work plan in Appendix C lays out a feasible approach to rerouting the river including suggested equipment, materials and labor forces. Work will occur in the late fall/winter between the months of October to January. An archeological resource study of the area will need to be initiated prior to construction and cultural resource monitoring may be required during the project.

In a nutshell, the plan recommends completing the reroute in three phases:

#### Phase 1: Mobilization & Site Preparation

Develop a small temporary access road to the new excavation site, begin fish capture and relocation in accordance with the Aquatic Resources Permit. See Figure 2.

#### Phase 2: Historical Channel Construction

Excavate the 1950s channel, use the spoils to build a berm along the proposed channel section, fill bulk bags and prep for Phase 3, continue to capture and relocate fish as needed. See Figure 2.

#### Phase 3: New Main Channel Construction

Excavate the new channel section, leaving a wedge of land between the existing channel and the upstream end of the new section. While excavation is occurring, set bulk bags in the existing river and begin pumping the area dry. Pump the water to the downstream end of the new channel. When the excavation is complete, remove the bulk bags and excavate the wedge from the south, slowly. Fish monitoring and relocation will need to occur along the stretch of existing river that is now expected to run dry. See Figure 3.

### 4. Permitting

All work will be completed in accordance with permits that are likely to include the following:

#### 4.1. United State Army Corps of Engineers (USACE) - Individual Permit (IP)

We discussed the possible reroute with the USACE. They indicated that an Individual Permit would be required. This permit can take up to 120 days to be issued and includes a 30 day public comment period. More information on this permit is included in Appendix C. The USACE did generate an administrative record our inquiry should this project move forward: POA-2019-00551.

#### 4.2. United States Fish & Wildlife Service (USF&WS)

The permitting information required by USF&WS is to be gathered through the USACE IP.

#### 4.3. Alaska Department of Fish & Game (ADF&G) – Fish Habitat Permit

CRW met with ADF&G to review the draft construction work plan and discuss the permit requirements for a river reroute. The Fish Habitat Permit is required to ensure that free passage is maintained for salmon and other anadromous fish in the Kanektok River during construction activities. According to ADF&G, there can be up to a 6 week lead time for permit reviews. The application can be submitted during the design stage. A copy of the permit application is included in Appendix C.

#### 4.4. Alaska Department of Fish & Game (ADF&G) – Aquatic Resource Permit

The Aquatic Resource Permit is required for the capture and relocation of any fish. The areas that will need to be monitored are shown on Figure 2 and 3. The General Contractor conducting the actual capture and relocation will be the applicant for the Aquatic Resource Permit. ADF&G may decide to travel to the site to ensure the initial set-up and monitoring plans are acceptable. A copy of the permit application is included in Appendix C.

#### 4.5. Alaska Department of Natural Resources (ADNR)

CRW attempted to meet with representatives from ADNR to discuss the permitting requirements for the river reroute. According to Clark Cox, the Southcentral Land Office Regional Manager for the ADNR, a Kanektok River reroute would “likely require several authorizations/approvals from multiple sections of the Division.” Mr. Cox wasn’t able to identify any specific permits that would be required and did not respond to multiple requests to meet, but he requested that ADNR be kept in future conversations regarding a river reroute. Bryan Raynes, a surveyor with ADNR, noted that they would require surveys of the river and new channel both before and after construction of the reroute.

### 5. Site Control

To implement either of the river reroute alternatives analyzed under the 2019 Study, site control across either Native Allotments US Survey 9665 Lot 1 or Lot 2 will be needed. See Figure 1. As part of this CDR a local Site Control Coordinator was hired to reach out to these land owners and inquire about the potential to obtain site control.

Landowners were asked to sign a statement of objection/non-objection for a river reroute project and subsequent request for site control. It is understood that the formal site control process for Native Allotments can be quite lengthy and requires close coordination with the Bureau of Indian Affairs. For the purpose of this CDR, the site control work was limited to documenting the landowner’s initial willingness to support the project and grant site control. The formal land appraisal and acquisition process was not initiated, however we reached out to the Native Village of Kwinhagak, Realty Director, Walter Johnson to inform him of our plans to gather input. A cover letter and form were sent to each landowner (and a copy provided to Mr. Johnson). All but one of the landowners did not support the river reroute and would object to a request for site control across their property. Some were curious about the other lands that might be available if a land trade was possible, suggesting that a few might support a future project. In general, however, there was not support from the landowners to grant site control for either reroute alternative. Copies of the initial letter and form, and responses from the landowners, are included in Appendix D.

## 6. Cost Estimates

The estimated cost of the river reroute is listed below. A more detailed estimate is included in Appendix E.

<b>Estimated Cost of Kanektok River Reroute Alt #1</b>	
Labor, Materials & Equipment	\$1,252,000
Contractor Overhead, Bonding & Insurance	\$226,000
Inflation & Contingency	\$232,000
Design & Permitting	\$257,000
Construction Administration	\$137,000
Grant Administration	\$35,000
<hr/>	
Total	\$2,139,000

The benefit-cost analysis (BCA) can be a helpful metric when applying for construction funding from public agencies. A BCA value of greater than 1.0, indicates that the benefits of the project would be greater than the costs. For the purposes of this CDR, the benefits of the river reroute are expressed as avoided costs that could be necessary should the river continue to erode the area, impacting homes and the school. Additional information on these costs can be found in Appendix E.

### **Estimated Benefits of Kanektok River Reroute (Avoided Costs)**

- 1) School Revetment - \$1.5 million
- 2) New Gravel Access Road to Borrow Source – \$1.4 million
- 3) Replacement Residential Structures (5) - \$1.5 million

Total Estimated Benefits - \$4.2 million

Total Estimated Cost - \$2.1 million

BCA =  $4.2/2.1 = 2.0$  A BCA over 1.0 indicates a beneficial project.

## 7. Potential Funding Sources

The intent of the river reroute is to reduce future damages associated with the recurring erosion of the old runway. As such, the reroute could technically be considered a hazard mitigation project. Funding for this type of hazard mitigation project could be applied for from the Federal Emergency Management Agency (FEMA) with matching funds from the State of Alaska. There are two significant caveats to this funding: the applicant must be a non-profit and there must be a recent (within 5 years) and approved (by both FEMA and the State) Hazard Mitigation Plan in place for the community.

To assist the community with addressing the erosion at the runway, CRW, with approval from the Denali Commission and Qanirtuuq, hired LeMay Engineering to update the community's Hazard Mitigation Plan. The plan is currently being reviewed by FEMA and the State. When approved, it can be used by either the City or the Tribe to apply for FEMA funding on behalf the community for the next 5 years. The two FEMA

Hazard Mitigation Assistance Programs that could be potential funding sources for the river reroute include:

**Hazard Mitigation Grant Program** - The Hazard Mitigation Grant Program (HMGP) provides grants to implement long-term hazard mitigation measures after a major disaster declaration is made in Alaska. The HMGP funds available are a function of the total disaster funding associated with the disaster declaration however the work does not need to be directly associated with the declared disaster. The State of Alaska Division of Homeland Security and Emergency Management (DHS&EM), accepts applications for the HMGP on a yearly basis. More information can be found online at <https://www.ready.alaska.gov/Grants/HMGP>.

**Pre-Disaster Mitigation Program** – The Pre-Disaster Mitigation (PDM) Program provides nationally competitive grants for hazard mitigation planning and implementing mitigation projects before a disaster event occurs. By funding these projects, FEMA hopes to reduce the overall risks to the population and structures as well as reliance on future funding after a disaster is declared. The State of Alaska DHS&EM accepts applications for PDM Program funding on a yearly basis. Note that there is a higher match required for PDM than for HMGP funds. More information can be found online at <https://www.ready.alaska.gov/Grants/PDM>.

## 8. Conclusion

Implementing Alternative #1 from the 2019 Study will require close coordination with permitting agencies and users of the river. As stated previously, the lack of willingness for the landowners to grant site control effectively ends the pursuit of the river reroute at this time. However, should opinions change in the future, this document could be updated and potentially used to seek funding for the river reroute. The benefit of the project is estimated to be greater than the cost to protect the school, replace lost homes and develop a new road to the community's gravel source. Ultimately however, the solution to addressing the erosion along the old runway, whether by river reroute, armoring with riprap or another solution, will require partnership between Qanirtuuq, Inc. and the community to be successful.